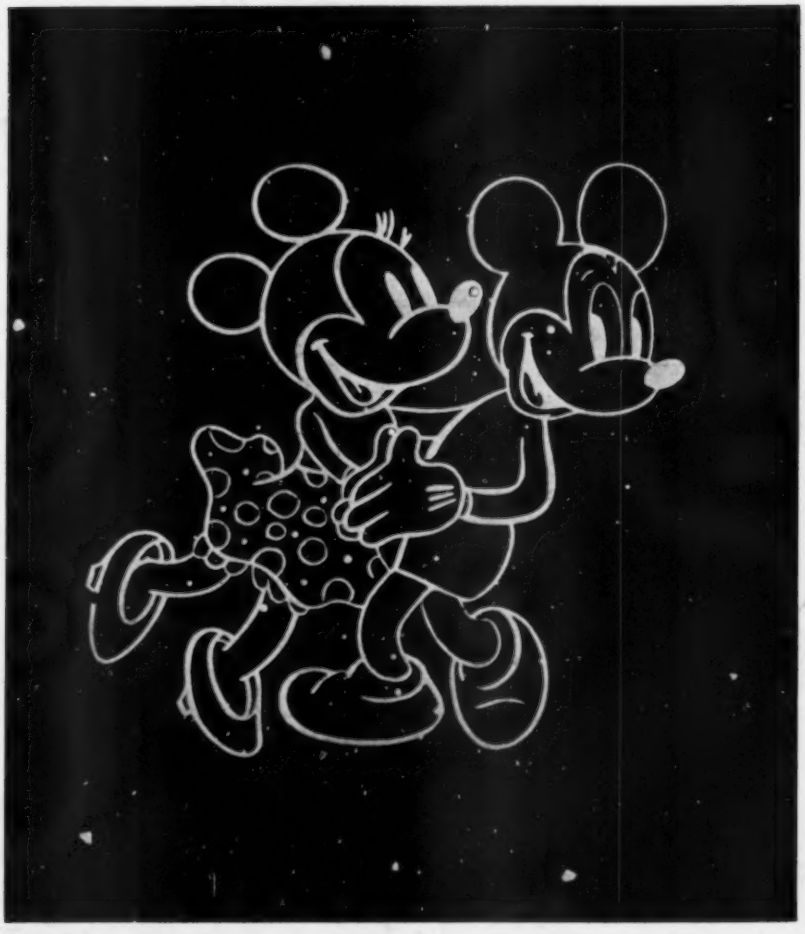
# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



April 12, 1941

## The Heavenly Twins

See Page 229

A SCIENCE SERVICE PUBLICATION

# Do You Know?

The first railroad *tunnel* in the United States was built in 1833 near Johnstown, Pa.

Ancient Egypt, says an archaeological writer, had only one or two types of *roses*.

Soviet Russia's scientific interests include an Institute for the Study of *Frozen Ground*.

The Bureau of Mines is developing a special process for producing *magnesium*, vital metal in defense.

Latest government researches on cotton hosiery provide more attractive and durable designs for girls' campus socks of *lisle*.

University of New Hampshire foresters are hunting high-yielding *sugar maples*, to study the best way of reproducing good stock.

The Arabian government believes United States methods of helping the Indians with *land* and economic problems may help the Bedouins.

*Diesel* engines are often thought of as heavy, but Diesels weighing less than two pounds per horsepower are being turned out for U. S. Army tanks.

The Metropolitan Museum of Art has acquired a medieval military *saddle* used on parade, made of richly carved staghorn plaques fastened to a frame of wood, rawhide and birchbark.

## QUESTIONS DISCUSSED IN THIS ISSUE

***Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.***

**ANTHROPOLOGY**

What change is taking place in the shape of American heads? p. 228.

**ARCHAEOLOGY**

How has an archaeologist determined the age at which Christ was crucified? p. 234.

What evidence has been found that the first five books of the Bible were all written by one man? p. 237.

**ASTRONOMY**

How can astronomers measure the size of the outer galaxies? p. 229.

Where has a spinning neon sign been found in the heavens? p. 236.

**CHEMISTRY**

How is golf affected by the high price of mercury? p. 232.

**GENERAL SCIENCE**

How does Dr. Rugg explain his aims in writing the much-discussed social science textbooks? p. 238.

What aid has the oldest scientific society in America sent to the oldest in Britain? p. 233.

**GENETICS**

What genetic refugees have come for safety to America? p. 232.

**HERPETOLOGY**

How do rattlesnakes detect their enemies? p. 232.

**MEDICINE**

What "exciting" discovery had been made about riboflavin and casein combined in diet? p. 227.

What substance from the kidney has been found to reduce high blood pressure in dogs? p. 233.

Why did scientists use medical treatment on sick germs? p. 233.

**NUTRITION**

In what foods can you obtain your daily supply of vitamin $B_1$? p. 231.

**PHYSICS**

How can you magnetize a paper clip? p. 232.

What should you do if you fall into quicksand? p. 232.

Why do physicists now think that light travels more slowly than has previously been assumed? p. 239.

**PUBLIC HEALTH**

What chemical was deadly in the heatless permanent wave solution? p. 228.

What is the lesson for Americans in the epidemic at Halifax? p. 227.

**SAFETY**

How long does it take a life guard to strap on the new life-saving oxygen shirt? p. 236.

Longer life for *dill pickles* is in prospect, since scientists have found that pasteurization keeps them from going limp.

A baby *oyster* is so unlike its parents that it has been described as resembling "a tiny thimble with a hairy belt around its middle."

*Seed* of shepherd's purse, black mustard and some other weeds may survive buried in the soil for 30 years, and sprout to make trouble.

The National Resources Planning Board has reported a case study of 144 *communities* that were constructed by a predetermined plan.

The Philadelphia College of Pharmacy and Science has been given largest known privately-owned collection of apothecaries' *jars and mortars*.

About 10,000 bales of low-grade American *cotton* will be used in high-grade writing paper this year, government agriculturists expect.


## SCIENCE NEWS LETTER

*Vol. 39* APRIL 12, 1941 *No. 15*

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 2101 Constitution Avenue, Washington, D. C. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years, $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give your old address as well as the new one, at least two weeks before change is to become effective.




Cable address: Scienserve, Washington.

Entered as second class matter at the postoffice at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

Members of the American Association for the Advancement of Science have privilege of subscribing to SCIENCE NEWS LETTER at $3 a year.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Advertising rates on application. Member Audit Bureau of Circulation.

**SCIENCE SERVICE** is the Institution for the Popularization of Science organized 1921 as a non-profit corporation.

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MEDICINE

# Vitamin Plus Casein Protects Rats Against One Cancer

## Substances Are Not Curative in Human Cancer But Finding Is Exciting Because It May Give New Lead

PARTIAL protection by diet against a certain type of experimental cancer in rats has been achieved in research at Memorial Hospital, New York City. The work is reported by Dr. C. P. Rhoads, C. J. Kensler, K. Sugiura, N. F. Young and C. R. Halter (*Science,* March 28.)

One of the B vitamins, called riboflavin, already prominent in diet news, and casein, chief protein of milk, are the diet ingredients responsible for the cancer protection.

"These two substances are not curative in human cancer," Dr. Rhoads declared. He said they have already been tried on cancer patients but no cures resulted.

Scientists hearing of the work of Dr. Rhoads and associates had been wondering whether these diet ingredients could protect man against cancer, even if they cannot cure it.

"There is no evidence bearing on the application of this principle to cancer in man," Dr. Rhoads said when asked about the possibility of cancer prevention in humans.

The results of the research are nevertheless considered "exciting." They give a new lead in the long search to find what relation, if any, diet may have to cancer, and they will encourage scientists to keep on working along this line with greater hope of finding something that is applicable to cancer prevention in man.

The rats in the experiments got cancer from being fed a dye called butter yellow. This chemical has nothing to do with butter and is not found in any foodstuffs. Its ability to cause liver cancer and liver cirrhosis was discovered by Japanese scientists who were trying to reproduce in laboratory animals a condition commonly found in people in southwestern regions of the Orient, as a step toward finding why so many of these people get cancer of the liver and stomach.

Butter yellow produces cancer of the liver in from 70 to 80 out of every 100 rats. When in addition to butter yellow the animals are given daily doses of riboflavin and casein, cancer develops at a rate of only 3 out of every 100, Dr. Rhoads and associates report.

Riboflavin alone, however, is almost without protective effect against the dye-caused cancers. The addition of casein to the riboflavin was suggested by Professors Vincent du Vigneaud and Dean Burk of Cornell University Medical College. They and the Memorial Hospital group are now trying to find what diet factors besides riboflavin may be involved in cancer protection and how casein exerts its protective effect in rats. The sulfur-containing amino acids, especially, are under investigation.

*Science News Letter, April 12, 1941*


***STRATEGIC***

***This is pure tungstic oxide that will be used to make the very fine wire for electric light bulbs. Westinghouse Lamp Laboratories are investigating the use of American tungsten ores which would make us independent of sources in the Orient.***

PUBLIC HEALTH

## Diphtheria Epidemic in Halifax a Warning

A DIPHTHERIA epidemic which raged in Halifax, N. S., this winter and threatened to slow that prize port's steady flow of supplies to embattled Britain has a lesson for us here in the United States. The story of the epidemic and of the Harvard Medical School expedition's part in controlling it has been delayed by war censorship. It can be told now that the epidemic is over and steps have been taken to prevent its recurrence.

Diphtheria is a preventable disease and has been so since the last great war. Toxin-antitoxin and toxoid when given to children are almost sure preventives of diphtheria in later life. Toxin-antitoxin was first used in 1913 and 1914. Most doctors and health authorities now urge parents to give their children this protection. In Halifax, apparently, parents had not been advised, or had not followed advice to have their children protected against diphtheria by immunization.

When the Harvard expedition arrived in Halifax, the town was, in the words of one member of the expedition, a virtual "hell-hole of infection." Its normal population of about 70,000 had nearly doubled and one-third of the city's doctors had been called to service.

Arriving ships brought the infections

of the world. The first to arrive, early last fall, was diphtheria. It spread quickly, and although antitoxin saved many lives, the number of sick shot upward sharply. Only one person in five was immune to diphtheria, it was found.

Immunity was no higher in the large army and navy population in and about the city. Officials had neglected routine immunization in the erroneous belief that most adults were immune anyway. This belief was based on surveys in large cities where the disease itself had conferred a natural immunity. Canada has had little diphtheria in recent years, and thus had little natural immunity.

The situation was quickly controlled by immunizing those who had not yet gotten sick. Army and navy officials ordered immunization for the troops and daily, free immunization clinics were set up for the civil population. The number of new cases began to decrease within a few days.

Many parts of the United States, like Canada, have had little or no diphtheria in recent years. Credit for some of this goes to the widespread diphtheria immunization campaigns conducted by health authorities. The Halifax experience, however, shows that there can be no let-up in the fight.

*Science News Letter, April 12, 1941*

PUBLIC HEALTH

# Examine All Heatless Permanent Wave Solutions

## Hydrogen Sulfide, Blamed for Fatality; Fluid Has Been Used Extensively Without Causing Any Known Injury

ALL heatless permanent wave solutions sold in interstate commerce are now being examined by the U. S. Food and Drug Administration, in an effort to avoid further tragedies such as the death on March 19 of a young matron in Atlanta, Ga., following the use of one such solution.

Futher interstate shipment of the particular solution involved in the Atlanta tragedy has been forbidden, Dr. W. G. Campbell, chief of the Food and Drug Administration, stated. Sale or use of bottles of the solution already in a state and perhaps on its beauty parlor shelves is a matter for local or state action, Dr. Campbell pointed out, and does not come within the jurisdiction of the Food and Drug Administration.

Hydrogen sulfide, the smelly poisonous gas that earlier generations of high school chemistry students knew from the odor of rotten eggs it imparted to laboratories was the chemical in the heatless permanent wave solution which killed the 39-year-old Atlanta matron.

This solution has been used extensively without causing any injury, so far as the Food and Drug Administration and medical societies, including the American Medical Association, know. A report of this apparently first fatal case, made by Dr. Allen H. Bunce, Dr. Francis P. Parker and Dr. George T. Lewis, of Atlanta, appears in the *Journal of the American Medical Association,* (April 4).

Women may, however, have been injured or made sick by the curling solution without the cause being known, Dr. Campbell pointed out.

Sleepiness, headache, irritation of the eyes, and dizziness are symptoms of poisoning from dilute concentrations of hydrogen sulfide. Many a woman experiencing these symptoms after a permanent wave may have attributed them to fatigue and not even bothered to call a physician. If the symptoms were more serious and a physician was called, the permanent wave may have been forgotten in the general excitement and the physician may thus have been deprived of a clue to the cause of the illness.

Special susceptibility to hydrogen sulfide may exist. This may explain why only one death has occurred from the use of the curling solution among the many women who have probably had it applied to their hair.

The danger of hydrogen sulfide poisoning, as well as its unpleasant odor, has led chemistry teachers to work out analytical procedures which avoid the use of this chemical in schools. Hydrogen sulfide has caused a number of deaths in industry. It is found in sewers, tannery vats, glue factories, vulcanizing, chemical and mining industries, and is used in the manufacture of sulfur dyes, especially the browns and khakies.

*Science News Letter, April 12, 1941*

ANTHROPOLOGY

# American Heads Broader; Long Heads Going Out

MORE grief for admirers of the long-headed Noble Nordic: American heads are growing broader, declares Dr. Ales Hrdlicka of the Smithsonian Institution. And not only American heads, but the heads of all known peoples—and the more civilized they are the more pronounced the trend toward broad-headedness.

It's largely a matter of getting better cooked meals, the Smithsonian anthropologist explains. Our heads, to start with, have no particular prejudices of their own as to shape. If we exert the chewing muscles attached to their sides, in eating tough food, our skulls plastically respond by becoming longer and narrower. If we work our jaws less, they remain closer to the natural rounded shape.

While there are numerous indications of increasing broad-headedness, Dr. Hrdlicka states, there is no instance known anywhere in the world where a people is becoming longer-headed.

"The skull," explains Dr. Hrdlicka, "may be regarded as comparable to a plastic bag filled with something that can only behave as a near liquid. Were other factors absent, this would necessarily give the skull the shape of a simple globe, or near-globe, as can actually be observed at certain embryonic or fetal stages. If the skull or that part of it, which contains the brain, assumes any different shape, the cause of this must lie essentially in factors outside the brain.

"The ultimate shape of the skull must be considered as the result of a series of mechanical agencies connected partly with the hereditary endowments of the different cranial bones and partly with the action of all muscular, pressural, and other outside factors that have operated on it from its beginning. A few weeks of accidental or artificial pressure will deform the skull of the newborn infant and the brain for all the rest of its life, and no amount of brain development will be capable of removing the deformation, showing that the brain, while influencing directly the size of the skull, has little effect on its shape."

*Science News Letter, April 12, 1941*

Tiny larvae of some flour-infesting *insects* can enter paper bags through holes made by the needles in stitching—solution, gum-latex tape over the sewing at top and bottom.

ASTRONOMY

# Distant "Universe" Found Much Bigger Than Supposed

## Examination of Photograph Made With Special Schmidt-Type Telescope Reveals Shape of Andromeda

PROOF that the distant Andromeda galaxy is about as big as our own galaxy, or Milky Way system, has been obtained by Dr. Robley C. Williams and Dr. W. Albert Hiltner of the University of Michigan.

The constellation of Andromeda, the chained lady, is overhead on autumn nights, and the galaxy may be seen, if the sky is dark, with the naked eye. It is so far away that light, travelling 11,000,000 miles per minute, takes about 720,000 years to reach us. About 15 years ago Dr. Edwin P. Hubble, of the Mt. Wilson Observatory, showed that it is a disk-shaped mass of stars, like that comprising the Milky Way, of which the sun is part. This is one of the nearest of these outer galaxies, but millions of others can be seen, with the greatest telescopes. Only a few are close enough for the individual stars to be revealed.

In appeared that the Andromeda galaxy and the others were far smaller than ours, which is estimated to be around 100,000 light years in diameter. Several years ago Dr. Joel Stebbins and Dr. A. E. Whitford made measurements with the electric eye attached to the 100-inch reflecting telescope at Mt. Wilson, the world's largest. These showed that the object extended much farther than one could see, or photograph, with the same telescope.

Using a new photograph of the galaxy, taken by Dr. Hubble with a special Schmidt-type telescope at the new Mt. Palomar Observatory, Drs. Williams and Hiltner have determined its shape. This has been done with an instrument invented by Dr. Williams, called the isophotometer. It automatically examines a photograph, and draws a line corresponding to a region of a certain brightness. It, also, uses an electric eye, which is sensitive to far slighter effects on the plate than the eye could detect.

From the lines drawn by this instrument, they find that, in its greatest length, the galaxy is at least 13 times as long as the apparent diameter of the moon. At the accepted distance for the Andromeda object, this corresponds to a linear diameter of 80,000 light years. Since there is some evidence that the object extends still farther, it seems that its size is about the same as our Milky Way. They also find evidence, far out from the center, of two previously unknown places where the stars are closer together.

One important feature of the work is that the measurements were made despite a considerable amount of fogging of the negative from the general light of the sky, which is present even at the best locations. In fact, in the outer parts of the galaxy, the brightness is actually less than the sky. However, the instrument detects the difference between the sky light, which is uniform, and the sky light plus galactic light, even though the latter is very minute.

*Science News Letter, April 12, 1941*

ASTRONOMY

## Cartoon Characters Lend New Romance to the Stars

**See Front Cover**

IN JULY the sun will be in the constellation of Mickey and Minnie Mouse! High in the northern evening sky appears Pluto the pup! On autumn evenings you can see the heavenly figure of Donald Duck!

Such statements as these will be perfectly reasonable if it should happen that new star groups, which are making their bow this month in the demonstration at the Fels Planetarium of the Franklin Institute in Philadelphia, should become generally adopted. For, with Walt's own permission and assistance, a whole galaxy of Disney characters appears on the artificial sky vault of the planetarium.

However, Wagner Schlesinger, director of the Fels Planetarium, and his asso-

*CONSTELLATIONS A LA DISNEY*

***The constellations of Bootes, the bear driver, and Corona Borealis, the northern crown, as they appear in star maps, are shown at the left. In the middle is the ancient figure, which dates back some 3,000 years. The right-hand picture shows how Walt Disney has fitted Madame Upanova, from the ostrich ballet in Fantasia, around these stars, for the April demonstration in the Fels Planetarium. The cover picture shows how Mickey and Minnie Mouse have been fitted around the stars of Gemini, the twins. Castor is in Mickey's face and Pollux in Minnie's nose. These pictures were photographed from the planetarium dome by Gladys Muller.***

ciates, have no hope that these groups will become generally used. Rather their purpose is to cause discussion and eventually to bring renewed interest in the constellations and the old myths.

"Literal-minded moderns," said Mr. Schlesinger, "sometimes fail to appreciate the significance of the naming of the constellations, and many fail to find the few good outlines of the figures in the sky. We should realize that the named areas were not originally intended to be portraits, but merely memorials to the persons, creatures, or objects for which the areas were named. The pictures were fitted to the stars much later.

"In these days when few learn and still fewer remember the classical myths, we might suggest the method of origin of the constellation names by modern analogies. For fanciful pictures in the stars, the figures of fanciful creatures might seem most appropriate, so in the Fels Planetarium during April the creations of Walt Disney, acknowledged master of whimsy, are featured.

"Madame Upanova, of the ostrich ballet, in 'Fantasia,' as well as the familiar characters in other Disney creations, are projected among the stars and found to fit as well as the ancient groups. The Sea serpent, Hydra, becomes a Fantasian Brontosaurus, looking down on a puzzled Goofy. Mickey and Minnie Mouse take the place of the Twins, Castor and Pollux. Pluto replaces Ursa Major, the Big Bear, of which the Big Dipper is a conspicuous part. Classical Cygnus, the Swan, plus a few neighboring stars, is transformed into Donald Duck, in as angry a pose as he ever displays. Even future Disney productions are not ignored; the Reluctant Dragon, as weird a creation as one could wish, replaces Ophiuchus and Serpens."

The apparatus by which the pictures are shown in the planetarium sky was first developed at the Fels Planetarium, and later used at others. Special projectors, made by planetarium technicians, are fastened to the framework of the Zeiss projector. Each has its own control at the switchboard where the lecturer stands. One by one, the imaginary figures are shown around the stars, gradually appearing, and then fading. Or, if desired, the entire sky may be filled with all figures at once. The old figures are not slighted, but they are shown also, in comparison with Mickey Mouse and his colleagues.

*Science News Letter, April 12, 1941*

RADIO—AERONAUTICS

# Light on Television Tube Shows Direction of Plane

## On Tube Like Those Now Used in Receivers, Pilot Can See His Compass Direction and That of Beam Station

BY SPOTS of light on the face of a tube like that used for receiving television pictures, an aviator can now see at a glance the compass direction toward which he is flying and also the direction of a radio station that he is using as a beacon.

This is possible with a new device just recognized by the U. S. Patent Office with patent 2,233,275, to Irving Wolff, of Merchantville, N. J. He assigned his rights to the Radio Corporation of America.

Present aircraft compasses show the point of the compass toward which the plane is heading. With radio direction finder the pilot can also determine the direction, with respect to the plane, of a radio station. Then some calculation is needed to tell the compass direction of the station from the plane.

In the new invention, a compass, either earth inductor or gyroscopic, and a radio direction finder are both connected to a television tube, on the face of which are graduated marks. Inside, a beam of cathode rays, failing on the face, causes spots of light to appear, and they show both the plane's direction and that of the transmitting station.

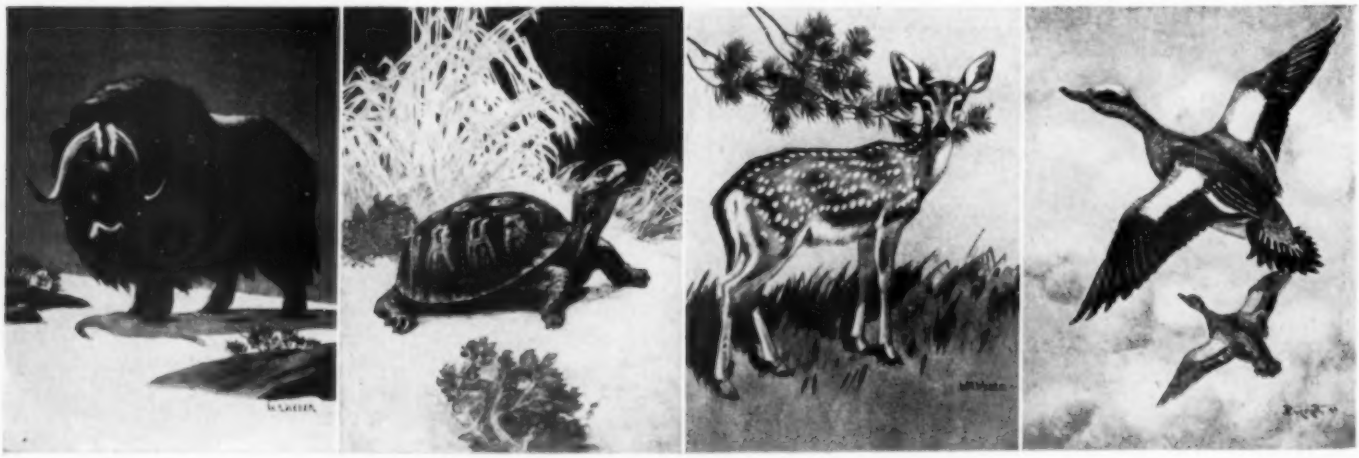
Mr. Wolff points out that this is especially useful because, when travelling at three or four miles per minute, the pilot should get this information quickly and directly without having to look at several instruments.

*Science News Letter, April 12, 1941*

There are ten species of *armadillos,* but only one really rolls up in its shell for defense.

### *NEW WILDLIFE STAMPS*

***The 1941 series of wildlife stamps are ready for distribution. Sponsored as in past years by the Wildlife Institute, proceeds of the sale are to be used in work leading to the restoration of America's native plant and animal species. The sample strip shown here includes: muskox, box turtle, fawn and baldpate ducks.***



NUTRITION

# Hitler's Secret Weapon is Depriving People of Vitamin

## Long Continued Deficiency in Thiamin, Essential Morale Vitamin, Brings Depression, Exhaustion, Despair

By DR. RUSSELL M. WILDER

**Mayo Clinic, Chairman, Nutrition Committee, National Research Council**

HITLER'S "secret weapon" may be the taking away of vitamin $B_1$ or thiamin from the diet of the conquered countries. A little thiamin deficiency is associated with irritability, but much or long-continued deficiency is more likely to result in depression, exhaustion and feelings of inferiority. We have good information that the Germans are making fullest use of the newest knowledge of nutrition in the prosecution of this war, particularly, in reference to the excellence of the nutrition of their armed forces. Rumor has it that the Nazis are making deliberate use of thiamin starvation to reduce the populations of the occupied countries to a state of depression and mental weakness and despair which will make them easier to hold in subjection.

Some Canadian soldiers, enlisted from relief rolls, were defiant, others were depressed to the point where they seemed useless to the Army, and it is reported that later, after satisfactory attention to nutritional deficiencies, they became perfectly manageable and effective. This is a story received from Canadian medical circles and I have reason to believe there is truth in it.

### Linked With Strikes

It is my personal opinion that there is a relationship between industrial unrest and deficiency of vitamin $B_1$ (thiamin). One of the symptoms of thiamin deficiency is irritability and lack of willingness to cooperate. I suspect that many industrial workers are led to make unreasonable demands because of the inadequacy of this particular vitamin in the diet. I also suspect that many middle-aged industrialists, getting paunchy and trying to keep down their weight, unconsciously restrict their diets in such a way as to fail to get enough of this vitamin, and, consequently, become hyperirritable. The result is that two people, both of them in abnormally irritable mental states are trying to deal with each other.

As a result of experiments which have been going on in the nutritional laboratories of the Mayo Clinic under the direction of Dr. Ray Williams and my supervision since July, 1939, I am personally convinced that insufficiency of vitamin $B_1$ (thiamin) is a principal cause for the majority of the nervous and mental abnormalities that are associated with or responsible for the psychological state, commonly spoken of as loss of morale. Some of these experimental observations have already been reported in the *Archives of Internal Medicine* (Vol. 66, Page 78-79, Oct. 1940). Much more data are to be presented by Dr. Williams at the coming meeting of the American Institute of Nutrition in Chicago, April 16.

### Women Are Subjects

When women who were apparently normal emotionally are subjected to a diet adequate in all other respects but very low in thiamin, within two or three weeks they develop mental symptoms which become progressively more serious as the duration of the restriction continues. These symptoms consist of inability to concentrate, uncertain memory, awkwardness, self-consciousness, progressive feelings of inferiority, irritability, depression, and anxiety. Cheerful, cooperative individuals become morose and unwilling to perform their ordinary tasks or to work with others.

When these symptoms have been produced rapidly by severe restriction of thiamin, where the subject receives not more than 1/6 to 1/10 of a day's requirement of this vitamin, and if these symptoms have not lasted longer than two or three months, they can be promptly corrected by restoring to the diet an optimal amount of thiamin. On the other hand, where the experiment has been continued six months or more and the restriction of thiamin has been less severe, and the development of symptoms has been slower, the effect of treatment from administering thiamin is less prompt. This leads me to believe that many chronic states of poor morale which the physician frequently sees in his office in the guise of neurasthenia represent a slowly reversible thiamin deficiency. It accounts for the fact that physicians often are disappointed when they attempt to treat neurasthenia with vitamins. The problem, as I see it, is to prevent these conditions by securing an adequate diet continuously. Once the symptoms are fully developed and firmly established they may be resistant to treatment.

### Few Food Sources

Thiamin is found generously in rather few foods such as whole grain cereals, lean meats, peas, and beans. People that fail to eat of these foods in sufficient amounts are likely to be deficient in thiamin. If a man or woman is depending on meat and beans to get the thiamin that he requires, he probably needs to eat much more than most people do eat of such foods. On the other hand, if he is eating a large amount of whole grain wheat, he can do with much less meat, peas, and beans and still get the amount of thiamin he requires.

Unfortunately, most people do not eat whole grain wheat. They eat plain white flour. For this reason, thiamin was one of the vitamins which the Committee thought was necessary to put back into white flour. "Enriched" flour contains enough thiamin so that if a man will consume 6½ ounces a day, which is the average American consumption of flour, enough thiamin will be added to that which he is receiving from other foods to give him what he ought to have. Most foods contain some thiamin, but many foods like the garden vegetables, formerly thought to be excellent protective foods, are poor in thiamin.

Poor people cannot afford much meat. They do not get much of beans and peas and do not know about the value of soy beans as a source of thiamin. They depend on plain white flour more than other people do because it is cheap, and thus they are very apt to get too little thiamin. They could get enough even using plain white bread, if they would eat large amounts of oatmeal and use not less than six ounces a day of either beans, peas, soy beans, or peanuts. The easier way is to put thiamin back into bread of which the poor people eat a great deal and that is the step which has been taken.

I have been emphasizing thiamin because I know whereof I speak when I talk of thiamin (*Turn to page 237*)

GENETICS

## British Sweet Corn Seed Finds Refuge in America

WAR refugees from bomb-battered England will presently include selected strains of inbred sweet corn, parents of some of the better hybrid varieties, according to plans of Dr. W. R. Singleton of the Connecticut Agricultural Experiment Station.

Dr. Singleton has been in correspondence with a leading English plant breeder, C. D. R. Dawson of London, and has asked him to send small quantities of his inbred seed corn, so that the strains may be kept going until after the war. Sweet corn is a luxury crop in England, and there will be neither land nor time to spare for it this spring.

Mr. Dawson has tried out American sweet corn hybrids which he has received from Dr. Singleton, and pronounces them quite good, under English conditions. He has also developed a successful English-American hybrid sweet corn, of which he has sent seed to Dr. Singleton.

*Science News Letter, April 12, 1941*

HERPETOLOGY

## Rattlesnakes Detect Kingsnakes by Their Odor

RATTLESNAKES detect their deadly enemy, the kingsnake, by odor rather than by sight, it is strongly indicated by evidence presented by C. M. Bogert of the American Museum of Natural History, to the American Society of Ichthyologists and Herpetologists. Kingsnakes, which average larger and stronger than rattlers, overcome and devour the latter whenever opportunity offers.

Mr. Bogert experimented with a considerable number of rattlesnakes of several different species, and also used one or two species of cannibalistic snakes other than the kingsnakes. In general, however, the results obtained were the same for all species, of both attacker and attacked.

Rattlesnakes, even those from regions where kingsnakes are unknown, always indicate recognition of their enemy by a peculiar defensive posture. The frightened rattler holds its head close to the ground, and throws a part of its body into a standing loop. With this it strikes against the kingsnake when the latter approaches, as a man might try to ward off an attacker with his elbow. To raise the head and defy the foe with bared fangs, as the rattlesnake does against any other enemy, would only expose it the more to a grab for the neck, which is the kingsnake's favorite hold. Another peculiarity of behavior is the rattlesnake's failure to sound its rattle when menaced by a kingsnake, although this threatening buzz is also an invariable part of its behavior in the face of any other enemy.

Rattlesnakes dropped into empty glass vessels in which kingsnakes had previously been confined immediately went into this defensive attitude. They did the same when exposed to the odor of a kingsnake, scraped off its back with a freshly whittled, clean pine stick. They showed the defense reaction when they were first blindfolded with adhesive tape and then introduced into the presence of the enemy species. But when they were deprived of the ability to detect scent by removing their tongues (which are necessary parts of the smelling apparatus in snakes) they were indifferent to the presence of kingsnakes, although the latter were in plain view.

*Science News Letter, April 12, 1941*

PHYSICS

## Paper Clips and Nails Magnetized With Sun Lamp

WITH ultraviolet rays from a common type of sun-lamp, concentrated by quartz lenses, it is possible to magnetize small iron objects like paper clips and nails.

Such experiments, made by Dr. Felix Ehrenhaft and Leo Banet in New York, have just been reported in a communication to the British scientific weekly, *Nature*. Before the Nazi conquest of Austria, Dr. Ehrenhaft was director of the Physical Institute of the University of Vienna.

They explain that their experiments were carried out in a private apartment with simple apparatus, since a dime store compass needle was used to detect the magnetization.

The iron objects were placed at right angles to the magnetic field of the earth (approximately east and west) and were exposed to the ultraviolet radiations for periods ranging from a few minutes to several hours. Magnetic poles were induced in them, and in some cases were present after several days. With short exposure, they state, the effect was local and on the surface, but after long exposure saturation values were obtained. Evidence was also obtained that the characteristic of a coil of wire around an iron core was altered by the rays.

Further experiments are being made.

*Science News Letter, April 12, 1941*

# IN SCIEN

PHYSICS

## You're Safe in Quicksand If You Keep Still

IF YOU ever have the misfortune to fall into quicksand, don't get panicky and thrash around. If you keep quiet, allow yourself to go down feet first and keep your arms outstretched, you will soon find yourself resting at a depth just below your armpits.

This is the advice given by Lawrence Perez, director of the Soil Mechanics Laboratory at Cooper Union. You stop sinking, he says, when your weight equals that of the quicksand you displace. As a matter of fact, he states, quicksand will support you twice as easily as water.

Mr. Perez says that quicksand is no particular type of material. Instead, it is a condition possible in granular soils where flowing water exists. The weight of the solid particles is balanced by the water pressure.

*Science News Letter, April 12, 1941*

CHEMISTRY

## High Cost of Mercury Affects Golf Green Care

GOLFERS are feeling the pinch of war, as the price of mercury, necessary in both munitions and medicine, goes rocketing. Mercury compounds are generally used in controlling two troublesome diseases of the grasses used on golf greens, known as brown patch and dollar spot.

Experiments conducted at the great experimental farm of the U. S. Department of Agriculture at Arlington, just across the Potomac from Washington, and at two nearby golf courses have given encouraging results with compounds of thiuram sulfide, one of which had already proved its value as an insecticide and for controlling one fungus disease of apples. Light treatment of this applied to golf greens have kept the brown patch and dollar spot fungi under control without noticeable injury to the grass.

First announcement of results of the experiments is made by George E. Harrington of the U. S. Golf Association. (*Science*, March 28.)

*Science News Letter, April 12, 1941*

# E FIELDS

GENERAL SCIENCE

## Scientific Society Here Aids Oldest in Britain

TO AID British scientists in publishing results of their researches, the American Philosophical Society has made a contribution of $10,000 to the Royal Society of London. A statement accompanying the gift expressed the hope that it would be used where it might be of most service in aid of science and learning in Britain.

"We make this gift," it concluded, "in filial regard for the Royal Society which was the model upon which Benjamin Franklin in 1743 founded the American Philosophical Society for Promoting Useful Knowledge Among the British Plantations in America and as evidence of the spirit of friendship and good will among men of science in both countries."

The Royal Society, chartered in 1662, is the oldest scientific society in Great Britain, while the American Philosophical Society is the oldest in this country.

*Science News Letter, April 12, 1941*

MILITARY SCIENCE

## Fire Control Device Aims Tossing Ship Guns

DIVE bombers, as well as enemy planes flying horizontally, are taken care of with a new automatic fire control system devised by Earl W. Chafee, of the Sperry Gyroscope Company. It is designed to operate even from a moving ship, pitching and tossing in a rough sea.

Details of the invention, as disclosed in U. S. Patent 2,235,826, just issued to Mr. Chafee, include an intricate electrical and mechanical system, connected with the range finder and automatically moving the guns. When the plane is sighted the mechanism calculates its exact distance and direction. To devices previously invented which do this for a fixed position, Mr. Chafee has added a second converter. First is figured the plane's position relative to fixed axes, then these are converted, with the aid of a gyro-compass, to a position relative to the ship. Since the guns are on the ship, they are then properly aimed.

Another part automatically figures out where the plane will be going, even if it starts diving, and keeps the guns aimed at the target.

*Science News Letter, April 12, 1941*

GENETICS

## Human Heredity Clinic To Study Defects, Diseases

STUDY of the inheritance of physical defects and tendency to diseases in human beings will be undertaken at the University of Michigan, as the result of the establishment of a department of human heredity in the University's laboratory of vertebrate genetics, and of a heredity clinic to be housed in the University of Michigan hospital. The new department and clinic will be closely associated with the University's medical school.

Although one or two clinics of this kind have operated in Europe, none has hitherto been established in this country. Among the subjects selected for special attention are hereditary dental abnormalities, body proportions and growth, speech defects, and deafness.

*Science News Letter, April 12, 1941*

MEDICINE

## Renin From Hog Kidneys Reduces Blood Pressure

RENIN, a substance extracted from kidneys, was so successful in reducing high blood pressure in dogs that, if it continues to live up to its present promise, it will be given a trial as a high blood pressure remedy for man, Dr. G. E. Wakerlin and associates at the University of Illinois report. (*Science*, April 4.)

Working with Dr. Wakerlin were Dr. C. A. Johnson, Dr. B. Gomberg and Dr. M. L. Goldberg.

The mechanism by which the high blood pressures were reduced, the scientists believe, probably involves development of immunity or perhaps of an antihormone. They have previously produced an antiserum for renin and the present experiments were undertaken with the idea of determining the value of "antirenin" actively produced in the treatment of experimental high blood pressure.

The anti-high blood pressure effect of the hog renin was not, in their opinion, due to the coincidental presence of an anti-high blood pressure substance from kidneys which two other groups of scientists have recently reported.

*Science News Letter, April 12, 1941*

MEDICINE

## Fever Treatment For Sick Bacteria

A NEW method of controlling virus-caused sickness in man, such as influenza, colds and infantile paralysis, may result from a discovery announced by Dr. A. P. Krueger, University of California bacteriologist who is commander of a laboratory research unit of the United States Navy working at the University in Berkeley.

A fever treatment for bacteria protected them from a virus that is as dangerous to them as the viruses of smallpox and yellow fever are to man, Dr. Krueger discovered. The bacteria-destroying virus is bacteriophage.

Bacteriophage, Dr. Krueger explained, holds a unique place among viruses. Instead of being harmful to an organism, it is beneficial, for it attacks disease-causing bacteria. Bacteriophage has been called a virus disease of bacteria.

As bacteria grow in an organism, each germ develops a substance, called a precursor, on which bacteriophage thrive. As the bacterium grows, the precursor increases and more phage develops. Soon the bacterial cell literally explodes with the accumulation of its parasite.

By keeping the bacteria at a constant temperature, Dr. Krueger discovered that the production of precursor and the growth of phage was halted. A mixture of growing staphylococci, a phage-producing bacteria, was kept at a temperature of 42.3 degrees centigrade. The bacteria continued to grow at this temperature, but no bacteriophage was formed.

*Science News Letter, April 12, 1941*

PUBLIC HEALTH

## Hospital Census Shows 1,226,245 Beds Available

PATIENTS entered hospitals in the United States at the rate of one for every three and one-tenth seconds during the year 1940, it is revealed by the latest annual hospital census, taken by the American Medical Association. (*Journal, American Medical Association*, March 15.)

Babies entered hospitals, not by the front door but by the way of the obstetrical department, to the number of 1,214,492 during 1940.

The total number of beds now available in registered hospitals throughout the nation is 1,226,245.

*Science News Letter, April 12, 1941*

ARCHAEOLOGY

# Christ Was Nearly 50

## New Studies of Babylonian Calendar Uphold Version In St. John's Gospel; Show Jesus' Life Was Longer

By EMILY C. DAVIS

JESUS CHRIST was not 33, but a middle-aged man nearly 50 years old, when He died.

And the crucifixion on new evidence can be definitely and finally fixed as occurring on April 7, 30 A.D.

The world's first Easter, therefore, was on April 9 of that eventful year.

These are the impressive, tradition-shaking conclusions of an American scholar, reached 1900 years and more after Christ lived and died in Palestine.

Star-gazing wise men of the East have played a role in presenting the new aspect of the adult Christ—like the wise men who, in Luke's narrative, followed the Bethlehem star to His cradle.

To Dr. Albert T. Olmstead, noted archaeologist and historian of the University of Chicago's Oriental Institute, who has reported these researches on the life of Christ, the usefulness of the work is this:

By dating the crucifixion exactly, students of the New Testament will have the basis for a decidedly exact chronology of the ministry of Jesus.

Also, there is now prospect of gaining a start toward fixing sequences of dates in the careers of the Apostles.

Documents which make up the books of the New Testament have much more value for reconstructing events in historic order than some Biblical critics have been inclined to think. So Dr. Olmstead is convinced. Results of his research, announced at the Graduate School of Theology at Oberlin, where he recently delivered the Haskell Lectures, will be published under those auspices in a special volume.

### Best They Could Do in 1655

In King James Bibles, dates in the margins of the pages still tell the reader that the world was created in the year 4004 B. C. The crucifixion is set down as occurring in 33 A.D. These represent the best that seventeenth century scholarship could do with such problems, when Archbishop Usher wrestled with the task of editing dates into the Bible, in 1655.

Since Usher made his decision, with little more than clues in the Bible itself and traditions to go on, our age of archaeology and systematic research has dawned. Thousands of clay tablets, inscribed with wedge-shaped Babylonian writing, have been unearthed and patiently deciphered. Buried cities in Palestine and elsewhere in the Bible world have been opened. Coins, pottery, and many other lines of evidence have helped with the huge puzzle of reconstructing dates and happenings, in all of which the Bible has importantly helped scholars to understand what they found, and in turn the Bible has become better understood.

So now, the calendar of the Babylonians, whose wise men gazed at the stars and tried to improve methods of counting time, comes into the solution of dating Christ's experiences on earth. The Babylonian calendar was very familiar to Christ. Jews of His day used it in reckoning their religious dates of the year.

That the Jews had adopted the Babylonian way of counting time when they were kept in enforced exile in Babylon is a well-known fact. And when they returned to their homeland, they continued to use it.

### Used Babylonian System

It must have been the Babylonian system of counting time that the New Testament writers had in mind, Dr. Olmstead points out, when they wrote their narratives so steeped in religious events.

"What is not so well known today," says Dr. Olmstead, "is that, thanks to astronomical tablets, we can establish a calendar for events in the late Babylonian period with rarely a probable error of a day. For the period from 367 to 11 B. C., our table is exact to the day. And we can extend the calendar through 45 A. D., by additional data gained from coins and recently found clay tablets."

Fitting this Babylonian calendar to the Passover dates of the year Christ died, Dr. Olmstead declares that he has clinched the evidence that the crucifixion was in 30 A. D. This date has been considered probably correct by a good many authorities, but uncertainties remained.

Like the involved plot of a mystery is the reasoning which leads him to the year 30, as the year of the crucifixion and the first Easter. For the situation is complicated by a question of whether or not the Last Supper of Christ and His disciples was really on the Passover day, or the day before.

Here is the way Dr. Olmstead builds up the reasoning:

Babylonian astronomers from 367 B. C. on began the day at midnight, as we do. But the Jews began the day with sunset.

### Agree on Thursday Night

Now, all four Gospels agree that the Last Supper occurred on Thursday night, which in Jewish usage was a part of Friday. But while Matthew, Mark, and Luke describe the occasion as a Passover

*HEAVENLY GUIDE*

***A Babylonian astronomical picture. Note the three symbols at the top of crescent moon and two bright stars, which in early Babylonia formed the heavenly guide to the start of a new year.***

*ANCIENT ASTRONOMY*

***Unreadable to most people in the world today, broken clay tablets like this reward scholars by making clear much of the Babylonian astronomy. This tablet records month by month the location of the 12 zodiac signs.***

feast, the fourth writer of Christ's biography, John, does not. He even indicates that the Last Supper was on the day preceding the Jewish Passover.

"On these conflicting data hangs the date of the crucifixion," declares Dr. Olmstead.

If John is right, he explains, the Last Supper was on the 14th day of the Babylonian spring month called Nisan. The Passover feast was always on the 15th. So, this would make the Passover of that year Friday, the 15th. If the other three biographers were the more accurate, then Thursday really was the 15th, the Passover date.

To find out whether Nisan 15 fell on Thursday or Friday in the possible years in which the crucifixion might have occurred, Dr. Olmstead prepared a new calendar table. The years 31 to 36 did not fit at all, because the Passover must have been during early days of the week in those years.

### Crucifixion on Passover

The only date that did fit upheld John's version, placing the crucifixion in the year 30, and the Passover on the day of the crucifixion itself.

Says Dr. Olmstead confidently: "The date of the crucifixion, April 7, 30, is as certain as any in ancient history and is more exact than the majority."

That John wrote his memoirs before the other Gospel writers, and wrote them very early after Christ's death is the view of some scholars, supported by this new research. By the year 50 A. D. the Apostle Paul understood that the Last Supper was a Passover meal, showing that this view of it was established before that time.

### Clears Up Obscurities

Accepting John's omission of details in describing the Last Supper as meaning that it was not a Passover feast, clears up obscurities in the last hours of Christ's conversation with His friends and the trial experiences:

"The disciples," says Dr. Olmstead, "did expect that Judas had left the Last Supper table to procure food for the Paschal (Passover) Meal. The high priests did refuse to enter the Praetorium lest they be defiled and unable to eat the approaching Meal.

"When John speaks of the 'preparation of the Passover,' instead of the expected 'preparation for the Sabbath' for Friday, he implies what afterwards he makes perfectly clear, 'great was the day of that Sabbath.'

"According to our table, the great day of the feast 15 Nisan, did coincide in the year 30 with the Sabbath and therefore according to Jewish custom was an especially holy day. Thus Jesus expired at the very hour when the paschal lamb was being slaughtered.

"Now at last we can understand why Paul insists: 'Our Passover is sacrificed, Christ; therefore let us keep the feast.'"

From his calendar studies and the outstanding importance given to the Gospel of John, Dr. Olmstead is now convinced that Christ was much older during His brief ministry than artists have painted him, and preachers have described Him.

Very significant, the archaeologist points out, is the statement by John that Jesus' enemies taunted Him as being not yet fifty years old. While Jesus astounded the teachers in the temple by child wisdom, He would not have become a teacher with a reputation for authority until near middle age.

Our method of reckoning time from the birth of Christ was started by a monk of the sixth century, who figured as best he could the time that had elapsed since the event. Even in Archbishop Usher's day, it was recognized that Christ was born a few years "B. C."

Now, the likelihood that the first Christmas was about 18 or 20 B. C., by our calendar, is emphasized in Dr. Olmstead's studies.

### Babylonian Calendar

Babylonian wise men, whose calendar lore has become important for explaining the birth date and death date of Christ, used a lunar year of 354 days. To keep the year from getting too badly out of step with the sun and the cycle of seasons for planting crops, the astronomers of early Babylonia apparently advised the King when he should insert an extra month in a year.

One of Hammurabi's decisions, which incidentally took account of taxpayers' deadlines, about 2200 B. C., is preserved on a clay document:

"Thus says Hammurabi: the year having gone wrong, let the coming month be registered by the name of Ululu the second. And instead of payment of taxes being made on the 25th day of Tasritsu, let it be made on the 25th day of Ululu the second."

Later, adding an extra month in certain years became systematic, thus giving modern scholars confidence in calculating Babylonian dates.

Astronomers have been attracted by the frequent use of three star symbols on Babylonian pictures. They came to realize that early Babylonians meant these to represent the Moon and the Constellation of the Twins that we call today Castor and Pollux. The three had a vitally important sky task for early Babylonia.

When the new moon appeared in the evening sky in spring with these two stars bright and close to it, the observers

signaled to the people that the new year had begun.

When Babylonian calendar records showed that the sign in the sky was late, and instead of being seen on the first evening of the expected month, the moon did not shine near the stars until the third evening, then the astronomers had an extra announcement. The calendar was slipping, and an extra month must be added.

Babylonian astronomy gained in exactness as time went on, making it possible now, thousands of years after, for persevering scholars to use the ancient lore in clearing up dates of interest to millions.

*Science News Letter, April 12, 1941*

SAFETY

## Life-Saving "Oxygen Shirt" New Aid to Life Guards

A LIFE-SAVING "oxygen shirt" to aid life guards in rescuing drowning persons is announced by Dr. Christian J. Lambertsen, of the University of Pennsylvania Medical School. (*Journal, American Medical Association,* March 28.)

With this new kind of apparatus strapped like a harness to his bronzed back and chest, the life guard will be able to stay under water for from 18 to 25 minutes in depths to 60 feet while searching for drowning accident victims, instead of the usual one minute at depths to 30 feet.

The oxygen harness which thus increases the life guard's life-saving ability weighs just over 12 pounds in air. Under water it is practically weightless. A small cylinder for oxygen or an oxygen-nitrogen mixture fits into a pocket. A nose and mouth mask, rebreathing bags, lead plate and a soda lime container are the other chief features. The breathing bags, breathing tubes and inhaler are all buoyant under water and their lift almost exactly balances the under water weight of the oxygen cylinder, regulator, soda lime container and lead plate.

The whole life-saving apparatus can be strapped on and be in use within 15 seconds or less. It is designed to fit persons of varied size and shape without time-consuming adjustments. Unlike the deep-sea diver's outfit, this apparatus does not require an assistant at the surface but it does not give the life guard protection against cold while under the water.

Besides helping life guards and others rescue drowning persons, the new apparatus could be used for inspection and minor under-water repairs of hulls of boats; for pearl and sponge fishing; sport, as in goggle fishing; and, with slight modifications, in mines, sewers, chemical plants and gas companies where the atmosphere is deficient in oxygen or contains noxious gases.

*Science News Letter, April 12, 1941*

ASTRONOMY

# Gigantic Pinwheel Star Shines With Many Colors

## Red, Yellow and Green Gases, Spiralling Out From Double Star Center Would Be Beautiful Sight

IF IT could be seen from the proper angle, through some super-telescope many times more powerful than any now contemplated, the star Sheliak would be revealed as a gigantic pinwheel of red, yellow and green gases, spiralling outwards from a double star at the center to a distance of 50,000,000 miles.

This star, called beta Lyrae by astronomers, is in the constellation of Lyra, the lyre, near the bright star Vega, now seen in the northeast about midnight.

The pinwheel conception is given by Dr. Otto Struve, director of the Yerkes Observatory. (*American Journal of Physics*, April). His ideas are based on the researches of his colleague, Dr. Gerald P. Kuiper.

Beta Lyrae is normally fairly bright, of the third magnitude, but in 1784 a 20-year-old deaf mute in England, John Goodricke, noticed that it varies in a period of a little less than a week. Later it was found that the star's cycle is really 12 days 22 hours. From its full brightness, after 6.5 days, it decreases about a third, then it returns to the original, and drops again, this time to about two-fifths of its former brilliance. Then it brightens again, and the cycle starts over.

Though it was long ago realized that this is a double star, with two parts, revolving around their center, and that sometimes both stars are visible, sometimes one, and sometimes the other, depending on which is in front, many peculiarities were discovered, requiring an elaboration of the theory. Many of these were found in analyzing the star's light through the spectroscope.

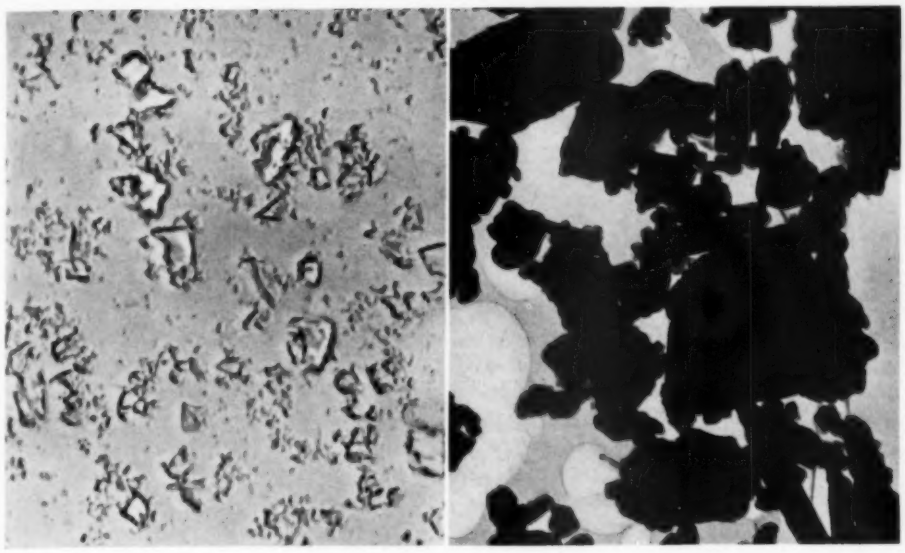
Now, however, astronomers have evolved what appears to be a satisfactory theory to explain its mystery. The two stars, one large, the other small, are actually in contact, and material flows from the big one into the smaller. As the system revolves, some of this is sprayed off and spirals outward. Dr. Struve summarized the conceptions as follows:

"The star is actually a binary, just as the older theory had predicted. However, the cool and relatively small star which turns around the hot supergiant is so much fainter in light that we cannot even photograph it; in the time required to record it, the image of the hot supergiant would be so completely overexposed that the photographic emulsion would be burned out. Of course, the distance of beta Lyrae is so great that we cannot actually see the pinwheel structure of the expanding gases, or the motion of the faint companion around the primary star. Even the greatest telescope now in existence is much too small to bring this marvel to our eyes. We must be content with information secured by theory and indirect observation.

"Imagine then a giant sun so hot that its color is essentially blue, so large that a good portion of the entire solar system could be hidden within its confines, and so brilliant that our sun would completely disappear in its glare. At a short distance, probably less than the radius of the large star, is another sun, yellow in color, and relatively cool, though hotter and considerably larger than our sun. This yellow star revolves around the blue supergiant once in 13 days. Its gravitational attraction upon the supergiant is tremendous."

The pinwheel would be a gorgeous affair, for, says Dr. Struve, "this spiral is hot—almost as hot as the blue supergiant; and the gases shine in all the colors characteristic of electric discharges in gases—luminous hydrogen with its red tinge, helium with yellow and green, neon with its red; the matter spirals out with a speed close to 100 miles per second."

*Science News Letter, April 12, 1941*



*FOR COATING PAPER*

***The new electron microscope provides a new view of the pigment used in coating paper. At the left is an electron micrograph of a new type calcium carbonate pigment, showing it to consist of solid, non-absorptive rhombs and fragments. Compare this view with that of the same pigment seen through a light microscope at a magnification of about 1,200 x. The electron micrograph has a magnification of about 22,000 x and was made by the American Cyanamid Co.***

ARCHAEOLOGY

# Bible Accuracy Proved By Egyptian Ways and Language

## Internal Evidence Indicates First Five Books of Old Testament Were Written By One Man in Moses' Time

DECLARING that ancient Egypt provides overwhelming evidence for historic accuracy of the Old Testament, Dr. Abraham S. Yahuda, British scholar now lecturing at universities and theological seminaries in this country, warns America not to accept German-inspired "higher criticism" of the Bible.

"Radical Biblical criticism in Germany has shattered the authority of the Bible and undermined its moral value, thus paving the way for the modern teachings of the Nazis," said Dr. Yahuda in an interview in Washington.

The first five books of the Old Testament, known as the books of Moses, are so full of correct detail about manners and customs of Egypt and contain so many Egyptian words and traces of language influence that these books could only have been written by one man. And that man must have lived in the time of Moses, when the Israelites were in close contact with Egypt, says Dr. Yahuda. He places Moses' leadership as occurring in the fifteenth century B. C.

"These results," he added, "have dealt a blow to the so-called higher criticism of the Bible, which maintains that the books of Moses were a conglomeration of many sources and were written long after Moses' death, in different periods between the ninth and sixth century B. C."

A single Bible verse describing the way in which the infant Moses was hidden in the bulrushes by his mother contains four Egyptian words: ark, bulrushes, slime, and pitch, the language specialist finds. The Hebrews in Egypt adopted many such words, blending them into their own speech.

The ark-like cradle of Moses was itself a clever device, calculated to catch the eye of an Egyptian princess, for Dr. Yahuda points out that such "arks" were used in carrying religious images in processions. The daughter of Pharoah, coming to bathe in the river, would think that such an ark contained a god's image that had fallen into the water, and would surely rescue it.

The Bible account of brick-making work of the Israelites during Egyptian bondage is likewise full of Egyptian detail, correct according to archaeological linguistic revelations. The "tale" of brick required of the workers was a measuring of the brick, for, says Dr. Yahuda, the practical-minded Egyptians measured building material. This very overseers' task of taking stock is pictured on Egyptian monuments.

Refusal of Pharaoh to allow the Israelites to take time off for worship becomes clearer in the light of Egyptian labor struggles of the time. Pharaoh had trouble with Egyptian workers who were suspected of using their religion as an excuse for idleness. Pharaoh's words to Moses furthermore indicate that strikes were possible at this time in Egypt, and the King charged Moses with trying to organize one.

The entire Bible story of Joseph is full of significant and vivid detail of Egypt's court life, prison life, and dealings with foreigners, confirmed by Egyptology, Dr. Yahuda also points out.

A British subject, born in Jerusalem, Dr. Yahuda has spent a lifetime studying Near Eastern antiquities, with special attention to Egypt's influence on the Old Testament.

*Science News Letter, April 12, 1941*

## From Page 231

and mental disorders. We have less certain information about the relation of deficiency of the other vitamins to mental disorders. With more knowledge we may come to appreciate that the lack of other vitamins is as important as the lack of thiamin for mental disorders. In the meantime prudence dictates that we should not only look to the adequacy of $B_1$ (thiamin) but also to the adequacy of all other vitamins.

*Science News Letter, April 12, 1941*

The practice of *painting* bridges in bright and attractive colors is said to be gaining favor with engineers.

## ●RADIO

**Scientists attending the Chicago meeting of the Federation of American Societies for Experimental Biology will join with Watson Davis, director of Science Service, on "Adventures in Science," over the coast to coast network of the Columbia Broadcasting System, Thursday, April 17, 3:45 p.m. EST, 2:45 CST, 1:45 MST, 12:45 PST. Listen in on your local station. Listen in each Thursday.**

GENERAL SCIENCE

# Rugg, Author, Charges Attempt To Censor Schools

## Fears That Succession of Crises Is Rolling Up Deep Cycle of Social Hysteria in America

A FEW "Merchants of Conflict" are blamed by Dr. Harold Rugg, Teachers College educator, with an attempt to censor the schools by having the Rugg social science textbooks and other publications banned. Located in strategic places, they employ systematically the facilities of national organizations and publicity channels, he says.

Dr. Rugg brings this counter-charge in a new book, *That Men May Understand*. (*Reviewed, SNL,* this issue)

The success of the "censors of the schools" Dr. Rugg attributes to the emotional state of the American people produced by a succession of crises—the depression, bewildering political conditions, the European War, the fall of France, and the total threat of totalitarianism.

"Out of the coincidence of these factors contributing to social unrest is rolling up the deepest cycle of social hysteria America has experienced for two generations," Dr. Rugg said.

Citing actual newspaper clippings, Dr. Rugg called 1940 a year of book-banning and book-burning, when bonfires were literally made of his social science textbooks. It was also a year of dramatic town meetings in which hysterical charges were made against Dr Rugg and his books, usually beginning, he said, with the same phrase: "I haven't read the books, but——"

At these meetings, the central note of the American way has, however, always been sounded by the chairmen: "All shall be heard." Dr. Rugg, himself, has always been asked to speak at those meetings which he has attended, and there have always, he said, been teachers and students who rose in his defense.

Dr. Rugg denies that he is a Communist, that he is a Socialist or that he has ever been affiliated with them directly or indirectly in any way whatever. The accusation that he says the American way is wrong or a failure is false, he declares.

What he has been trying to do is "to blaze a clear path toward understanding for young people—understanding of the tremendous agelong changes and of the rapid changes in industrial society during our own times. We dare not, I insist, keep children in ignorance of these changes and of their hidden significance."

Dr. Rugg has his own charges to bring against his critics.

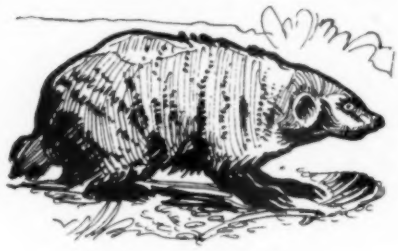
"The real animus of the merchants of conflict is that we do not teach in our books their personal brand of the American system of private enterprise. Their personal brand, I say. To them—to judge from their statements—the American system means competition without any regulation or control . . . old-fashioned laissez faire . . . 'every man for himself and the devil take the hindmost.' They want this system taught, and they would control the school and censor its books to see that it is taught."

*Science News Letter, April 12, 1941*

Brazil has three *airplane* factories, and a fourth being built.

ZOOLOGY

## NATURE RAMBLINGS by Frank Thone



**"Don't Tread on Me!"**

"DOORMAT" is one of the nicknames tossed at the badger. It has all the deceptive seeming appropriateness of a nickname, for the animal is squat, and broad, and very shaggy.

But let no one presume upon appearances, and try to use the badger for what he seeems to be. He is such a doormat as might appropriately bear the motto displayed on the famous Colonial battleflag: "Don't tread on me!" Against a world that makes fun of his short legs, his waddling frame, his uncouth hairiness, the badger remains permanently mobilized. He is the most dour citizen of the forest.

In pioneer days badger-baiting was considered a rare sport. To be sure, it was esteemed so mainly by the more loutish section of the male population, which gets more fun out of seeing others fight than it gets out of indulging in strenuous contests of its own.

A good, solid, heavy male badger was

matched against a pack of such dogs as could be induced to face it, and left to fight it out to the death. The tactics of the dogs, dashing in one or two at a time to worry the poor beast and then leaping back to safety, never giving the victim a moment's peace, gave rise to the verb, "to badger."

The odds were usually arranged in favor of the dogs, and they had to be pretty heavy, too; for the badger has a neat way of biting a dog's forepaw that cripples at the first onset, and a dog once bitten was more than twice shy. Moreover, the long, thick hair on the badger's back pretty effectually protected it against attack from above.

One canine enemy has a right to be feared, and that the least likely-looking of dogs—the long, trundling, mild-mannered, comical-looking dachshund. The Old-World badger is known in German as *Dachs,* and this short-legged, long-jawed breed was originally called into existence as a badger-battler.

The dachshund's encounter with the badger was no one-sided affair, either. It was strictly a duel between one dog and one badger, and in the latter's own home den, too. That is why the dachshund's legs were kept so short and his muzzle drawn out so long. He could run in to the attack almost as low as a snake, and get under the badger's guard to seize him by the throat. Pet dachshunds of today may not look it, but they are descendants of warriors.

*Science News Letter, April 12, 1941*

PHYSICS

# Speed of Light Slightly Less Than Previous Values Showed

## No Slowing in the Rate at Which It Travels, But Method of Measurement Is Now Made More Accurate

LIGHT travels at a speed of 186,272 miles per second, a figure which is probably not more than 8.7 miles per second in error.

This new value, about 12 miles per second less than hitherto generally accepted by scientists, was announced by Dr. Wilmer C. Anderson, now with the American Research Company, of Beaumont, Texas. He made the determinations while on the staff of the Cruft Laboratory of Harvard University.

This does not, however, mean that the velocity is lessening, for he has included correction for a factor known as "group velocity," which has been assumed to be negligible in previous researches and has been neglected. This might amount in some cases, he says in a paper in the *Journal of the Optical Society of America* (March), to as much as 4.3 miles per second. He concludes, therefore, "that the velocity of light is a constant as nearly as we can measure it at present."

Dr. Anderson's measures were made with the aid of an electric eye, or photoelectric cell, and used automatic means of recording the data, eliminating, to a great extent, errors of human measurement.

Fundamentally, this was the method used: An electric current vibrating 19,200,000 times a second controlled a Kerr cell, which is a form of light valve, and produced a beam of light with the same number of variations per second. This beam, therefore, was made up of sections of light a few feet long, alternated with dark spaces of the same length.

By a mirror with a very thin coating of silver, this beam was divided into two. One part was sent to a nearby mirror and back, the other part traveled over a much longer path, before it was sent back, and the two recombined, to fall on the electric eye.

If the two parts of the beam are joined so that the bright and dark portions are exactly in step, then the light falling on the electric eye varies just like the original beam, and there is a maximum electric current from it. Now, if the nearby mirror is moved, the path of the first part of the light beam may be increased by just the length of one of the bright sections. Then, when the two parts of the beam are brought together again, the dark part of one will coincide with the bright part of the other. The resultant beam will then be steady, and no current will come from the electric eye. From the difference in the light paths when this minimum value of the current is reached, the speed of the light may be calculated.

Elaborating greatly on this fundamental method, Dr. Anderson and his associates made 2,895 measurements. These give the speed of light as 299,776 kilometers (187,272 miles) per second. This may be in error as much as 14 kilometers (8.7 miles) per second. The chief source of error remaining is one that involves the electrons in the electric eye which watches the changing light beam. The electrons which are shot out from the sensitive surface of the photoelectric cell where the two parts of the beam strike, have to travel a slightly different distance, and this prevents the most accurate measurement of the times when the beams are in and out of step.

This problem, he says, will have to be solved before the accuracy of the method may be increased.

*Science News Letter, April 12, 1941*

AGRICULTURE

## Harvesting Machine For Pyrethrum Flowers

A HARVESTING machine for pyrethrum flower heads, combining features of corn binder and cotton stripper, has been developed by workers of the U. S. Department of Agriculture. With it, two persons can harvest the flowers from at least four acres of pyrethrum a day.

Pyrethrum is the base of several types of insecticide, especially of the fly- and mosquito-repellent sprays that have become popular in recent years. It is a plant closely related to the chrysanthemum, with flowers that look like white daisies. The effective principle is found mainly in the flower heads, shortly after opening.

Because it has always had to be hand harvested, pyrethrum has never been grown on a commercial scale in this country. Instead, we have depended on imports from lands where labor is cheap, principally Japan, Yugoslavia, Brazil and Kenya in Africa. During the past couple of years imports from Japan have slumped sharply, and the increasing quantities received from Africa have not made up for the shortage. Present imports are far under the all-time high of 20 million pounds, brought in during 1937.

The Department of Agriculture has just issued a publication on the new machine, prepared by A. F. Sievers and M. S. Lowman of the Bureau of Plant Industry, and W. M. Hurst of the Bureau of Agricultural Chemistry and Engineering.

*Science News Letter, April 12, 1941*

# •First Glances at New Books

GENERAL SCIENCE

A HISTORY OF MAGIC AND EXPERIMENTAL SCIENCE, Vol. V and VI, The Sixteenth Century—Lynn Thorndike—*Columbia Univ. Press,* 695 p. and 766 p., $10 a set. Covering the period from about 1500 to 1630, these two volumes complete Dr. Thorndike's monumental history of magic and experimental science. The present work shows the extent of the classical reaction against the ideas and institutions of the middle ages, and how new facts added to outworn systems resulted in confusion rather than enlightenment. The quest in those times was for the secrets rather than the laws of nature, a quest which has not yet ended by any means. This was the time of Leonardo da Vinci. Out of the magic, what was to become modern science was being born. Timely, in a new darkening of intellectual effort, is information on persecution and intolerance, political and religious fugitives and intellectual bootleggers and idea-runners of those important 16th century days.

*Science News Letter, April 12, 1941*

PHOTOGRAPHY

TILT OF THE AERIAL PHOTOGRAPH BY GRAPHICAL RESECTION—Ralph O. Anderson—*Pub. by author, P. O. Box 882, Chattanooga, Tenn.,* 50 p., $1. A technical pamphlet of interest to those concerned with the use of aerial photographs in mapping.

*Science News Letter, April 12, 1941*

BIOGRAPHY

MCGILLYCUDDY, AGENT, a Biography of Dr. Valentine T. McGillycuddy—Julia B. McGillycuddy—*Stanford Univ. Press,* 291 p., $3. Stirring adventures thronged the life of Dr. McGillycuddy, who went through Indian war experiences, and later headed the formidable Sioux agency at Pine Ridge, which called for courage. Picturesque characters move through pages of the book: Sitting Bull, Buffalo Bill, Calamity Jane, and many others.

*Science News Letter, April 12, 1941*

HISTORY

LIFE AND LETTERS OF VASCO NUNEZ DE BALBOA — Charles L. G. Anderson — *Revell,* 368 p., illus., $3.50. "The most attractive and tragic figure in the Hispanic conquest of the New World" was Balboa, first European to view the vast Pacific. So Dr. Anderson characterizes this Spanish nobleman, telling his story from arrival in the New World hidden in a ship's sail, to execution on charges of treason—unjust charges, the biographer avers.

*Science News Letter, April 12, 1941*

ETHNOLOGY

KWAKIUTL DANCING SOCIETIES—Philip Drucker—*Univ. of Calif. Press,* 29 p., 30c. (Anthropological Records, Vol. 2, No. 6.)

*Science News Letter, April 12, 1941*

GEOGRAPHY

WISCONSIN, A Guide to the Badger State — Writers' Program, Wisconsin W. P. A.—*Duell, Sloan and Pearce,* 651 p., illus., $2.75. Quantities of fine illustrations are the first impression, as you open this newest volume in the American Guide Series. These guidebook writers think of everything, down to giving brief hints on traffic peculiarities and telling where sports can be enjoyed in various cities. And there is a wealth of state history and facts and figures.

*Science News Letter, April 12, 1941*

ETHNOLOGY

RANK AND WARFARE AMONG THE PLAINS INDIANS — Bernard Mishkin — *Augustin,* 65 p., $1.50. Rank and warfare among Plains Indians can be clearly understood only in the light of sociological and economic conditions in the Plains, the author emphasizes. Particular attention is given to the advantage which horses gave to Plains tribes, in military and economic strength.

*Science News Letter, April 12, 1941*

ETHNOLOGY

TAOS TALES — Elsie Clews Parsons — *Augustin,* 185 p., $3.50. Winter evenings are the time when Pueblo Indians at Taos, New Mexico, like to tell stories. And here are nearly 100 of these native American stories written down by an ethnologist who has a special gift for conveying the literary art of the Indian tale.

*Science News Letter, April 12, 1941*

MATHEMATICS

INTRODUCTION TO ALGEBRAIC THEORIES —A. Adrian Albert—*Univ. of Chicago Press,* 137 p., $1.75. A mathematical text which assumes a prerequisite knowledge of that part of the theory of equations given as a chapter of the ordinary text in college algebra, as well as a reasonably complete knowledge of the theory of determinants.

*Science News Letter, April 12, 1941*

AUTOBIOGRAPHY

QUEST, THE EVOLUTION OF A SCIENTIST—Leopold Infeld—*Doubleday, Doran,* 342 p., $3. Double-barreled biography that gives an insight into the workings of the mind of a mathematical physicist, born in the ghetto of Cracow, who became a collaborator of Einstein. This is a very human, readable document.

*Science News Letter, April 12, 1941*

ECONOMICS

THAT MEN MAY UNDERSTAND, An American in the Long Armistice—Harold Rugg—*Doubleday, Doran,* 355 p., $2.75. See page 238.

*Science News Letter, April 12, 1941*

CHEMISTRY—PHYSICS

MYSTERY EXPERIMENTS AND PROBLEMS FOR SCIENCE CLASSES AND SCIENCE CLUBS (3d ed.)—J. O. Frank and Guy J. Barlow—*J. O. Frank,* 193 p., illus., $2.25. Full directions, with diagrams, are given for many scientific "stunts" which teachers should find most useful in arousing their students' interest. All of the experiments can be performed with relative simpilicity.

*Science News Letter, April 12, 1941*

ETHNOLOGY

LAW AND STATUS AMONG THE KIOWA INDIANS — Jane Richardson — *Augustin,* 136 p., $2. Cites and analyzes representative law cases occurring in tribal society of these Oklahoma Indians. Special discussion is reserved for absconding cases —"the big source of trouble among the Kiowa"—and ways in which status conditioned the pattern of justice.

*Science News Letter, April 12, 1941*

GEOGRAPHY

UNCLE SAM'S PACIFIC ISLETS—David N. Leff—*Stanford Univ. Press,* 71 p., $1. Discusses geography, history, and international significance of Wake, Kingman Reef and other islands very important now to Uncle Sam.

*Science News Letter, April 12, 1941*

ENGINEERING

AIR CONDITIONING PRINCIPLES — Charles Osborn Mackey—*International Textbook Co.,* 210 p., $2. Principles are here presented rather than complete description of the equipment and controls used in air conditioning work, so the author suggests that study of the text should be accompanied or preceded by a study of equipment.

*Science News Letter, April 12, 1941*